IN THE CLAIMS

1. (Currently Amended) A method for making an electrode by depositing nano-particles on an object having a microstructure, comprising:

a. forming a nano-particle dispersion comprising;

i. providing between 0.05 wt % and 10 wt % of a charged soluble polymer having a molecular weight of less than 25,000 amu;

ii. providing between 0.5 wt % and 10 wt % of a metal component;

iii. providing between 99.45% and 80% of a carrier; and

iv. mixing the charged soluble polymer, metal component and a carrier;

b. coating an object with the nano-particle dispersion thereby disposing nano-particles from the nano-particle dispersion on the object and into the microstructure to form an electric conductor, wherein the microstructure is configured to receive and retain the nano-particle dispersion;

c. removing at least a portion of the carrier from the object;

d. forming an electrical circuit using the electric conductor such that electric current flows in at least a portion of a medium using the electric conductor; and

e. connecting the electrical circuit to a load.

2. (Original) The method of claim 1, further comprising the removal of at least a portion of the polymer from the object.

3. (Original) The method of claim 2, wherein the at least portion of the polymer is removed by a method selected from the group consisting of washing, burning, ablating, pyrolyzing and combinations thereof.

4. (Original) The method of claim 1, wherein the carrier is removed by a member selected from the group consisting of evaporation, freezing, critical drying and combinations thereof.

5. (Original) The method of claim 1, wherein the nano-particles are crystalline.

6. (Currently Amended) The method of claim 1, wherein the ~~object is selected from the group consisting of a material containing a micro-structure, a porous material with micro pores~~ microstructure comprises a plurality of micro-channels formed in the object~~, a material into which a micro-structure pattern has been formed, and combinations thereof~~.

7. (Currently Amended) The method of claim [[1]] 6, ~~further comprising forming features on the object,~~ wherein the micro-channels ~~features~~ have an average width from about 50 nanometers to about 100 microns.

8. (Original) The method of claim 1, wherein the object is electrically conductive.

9. (Currently Amended) The method of claim [[1]] 7, wherein the micro-channels include an aspect ratio between approximately one and approximately 50 ~~object comprises features having an average width from about 50 nanometers to about 100 microns~~.

10. (Original) The method of claim 1, wherein the polymer comprises a member of the group consisting of a polyacrylate, a polymethacrylate, a monomer of acrylates, a sodium acrylate, a potassium acrylate, and combinations thereof.

11. (Original) The method of claim 1, wherein the metal component is selected from the group consisting of a noble metal, a transition metal, alloys of noble metals, alloys of transition metals and combinations thereof.

12. (Original) The method of claim 1, wherein the carrier is selected from the group consisting of water, low surface tension organic liquids miscible with water and combinations thereof.

13. (Original) The method of claim 1, wherein the dispersion comprises a nano-particle having an average diameter of between 1 nm and 50 nm.

14. (Original) The method of claim 1, wherein the electric conductor is adapted to conduct current between 0 amps per square centimeter and 100 amps per square centimeter.

15. (Currently Amended) The method of claim [[7]] 1, wherein the micro-features ~~features~~ comprise at least one of pores, capillaries, channels, voids, ridges, fins, embossments, and combinations thereof.

16. (Currently Amended) The method of claim 15, wherein ~~each of~~ the micro-features ~~features~~ have equivalent diameters ranging from about 25 nanometers to about 10 microns.

17. (Currently Amended) The method of claim 15, wherein each of the micro-features ~~features~~ comprise an aspect ratio of approximately 1 or more and an overall width from about 5 nanometers to about 200 microns.

18. (Original) The method of claim 1, wherein the object is selected from the group consisting of a foam, a monolith of porous material, an aero gel, a mat, a felt paper, mesh, laminates thereof, composites thereof, and combinations thereof.

19. (Original) The method of claim 7, wherein the features are created using a method selected from the group consisting of etching, cutting, molding, laser treatment, electro-discharge machining, water jet cutting, microinjection molding, packed particle sintering, extruding, deep reactive ion etching, LIGA processing and combinations thereof.

20. (Cancelled)

21. (Cancelled)

22. (New) A method, comprising:

combining selected amounts of a charged soluble polymer, a metal component and a carrier to form a nano-particle dispersion;

providing a substrate that includes micro-features that extend into the substrate, wherein the substrate is hydrophobic in regions external to each of the micro-features; and

distributing the nano-particle dispersion onto the substrate so that the nano-particle dispersion is substantially retained within the micro-features, and not in regions external to each of the micro-features.

23. (New) The method of claim 22, wherein providing a substrate that includes micro-features comprises providing a substrate that includes at least one of a micro-pore and a micro-channel.

24. (New) The method of claim 22, wherein providing a substrate that includes micro-features comprises forming the micro-features to have a width that ranges between approximately 500 nanometers and approximately 200 microns, further wherein the micro-features have an aspect ratio that ranges between approximately one and approximately 50.

25. (New) A method, comprising:

combining selected amounts of a charged soluble polymer, a metal component and a carrier to form a nano-particle dispersion;

providing a substrate having a surface and a plurality of micro-channels extending into the surface of the substrate;

altering the surface of the substrate to impart a hydrophobic character to the surface; and

distributing the nano-particle dispersion onto the substrate so that the nano-particle dispersion is substantially retained within the micro-channels and not on the surface.

26. (New) The method of claim 25, wherein altering the surface of the substrate comprises masking the surface so that portions of the surface external to the micro-channels is rendered hydrophobic.

27. (New) A method, comprising:

preparing a nano-particle dispersion that includes predetermined amounts of a charged soluble polymer, a metal component and a carrier; and

preparing a substrate to receive the nano-particle dispersion, wherein the substrate includes a first portion altered to be non-wettable by the nano-particle dispersion, and a second portion that is wettable by the nano-particle dispersion.

28. (New) The method of claim 27, wherein the first portion is an external surface of the substrate, and the second portion includes micro-features extending into the substrate, further wherein preparing a substrate comprises masking the external surface to render the external surface non-wettable.